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The development of Protocal For Documenting Vehicular Sitting Posture of Car Occupants Involved in Rear End Collision

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ABSTRACT

This paper describes the development of a protocol for documenting the sitting posture of passenger vehicle occupants which can be used to examine the relationship between vehicle seat design and soft tissue neck and back injuries resulting from rear-end collisions. The protocol is being developed as part of research program at the Insurance Corporation of British Columbia (ICBC) and with support from Transport Canada. Each year, soft tissue injuries account for about 70% of all ICBC claims which translates to an annual cost of approximately $250 million dollars.

The vehicular sitting posture of two groups of 50 passenger car drivers who have been involved in low speed rear-end collisions is being examined. The first group comprises insurance claimants complaining of pain and significant discomfort in the neck and back region 24 hours after the accident. The second group comprises seeking reimbursement for rear impact vehicle damage only.

In brief, the vehicular sitting posture of each "subject" is documented as follows. The style of the seat back and any head restraint and their reported positions at the time of the accident are recorded. The relative position of the claimant's shoulder and back of head to the vehicle seat and head restraint is measured and whether the correct head restraint height was or was available to the claimant. The claimant's weight, height and sitting height are also recorded.

The purposed paper will include a detailed description of the way in which the sitting posture of each claimant is documented. Comments shall be made on the successful features and the limitations of the protocol.

(The particular paper was received past the deadline for submission.)

DISCUSSION

PAPER: **The Development of Protocol For Documenting Vehicular Sitting Posture of Car Occupants Involved in Rear End Collisions**

PRESENTER: Jocelyn B. Pedder, RONA Kinetics and Associates Ltd.

Q: Arnold Siegel, University of California

This is not a question, just a point of historical information. The reason that there are head restraints, or the first head restraints, that were put into automobiles, was an experimental study done at UCLA. And we began to run rear end impacts using human volunteers in 1953-54. In 1957, the old American Motors Company put together funds for us and we built some head restraints into seats and then, I believe about 1959-60, American Motors came out with the first head restraints which still are adequate. Thank you.

Q: Guy Nusholtz, Chrysler Corporation

Did you put any effort towards figuring out where the driver actually was during the impact, because it looks like you're determining where he might be in a nominal seating position. But that may not necessarily relate to where he actually was when he was driving.

A: Yes. Let me just give you an example that actually might have happened to you today. By tomorrow you'd probably be driving that same car to a Claim Center. As you gathered, the damage to the car is pretty minimal, but you are probably sitting there thinking maybe that's's good for a $30,000 soft tissue claim. At that point, you come in. We do check. We have as part of our checklist whether you were driving at the time of the accident. And has your seat changed, has somebody within your family driven it or whatever. If, in fact, somebody within your family or somebody else has driven the car into the Claim Center, it's all included in the study. We asked them, "How were you sitting at the time of the accident?" We put big emphasis, again, trying to take away from the emphasis on the head.

We put big emphasis on where were your feet. You know, what pedals, would you show us how they were, and I guess some are better than others. The ones you see there knew they were being photographed for this photographic session. As I said, you will see some variance before they change that, but the point was that we asked them to please sit as you were immediately prior to the impact. The majority of them, of course, were stationed prior to impact at intersections waiting to merge, or waiting to go through, or waiting for the light to change. I suppose that the most amusing was that we had one young gentlemen who we asked, "Please tell us how you were sitting at the time of the accident." And, with that, he put his hand up and showed a great look of surprise.

So, I guess, maybe I should have shown those photographs, but they are strictly confidential, so on the whole pretty close because you are the person sitting in the relaxed mode at traffic lights, and so on. And I think you've got to allow and assume that the person has put their head back to some degree when we were taking the photographs.

Q: What sort of information do you get to classify the soft tissue injuries outside of the fact that "Oh, I got a pain in my neck."

A: Thank you. You remembered to ask the question. You've asked what I think is the most interesting of all the points, and I was going to cover it. But let me just real quickly show a couple of overheads here.

What happens on those who are reporting soft tissue neck injuries and who look if you were sitting there and looking like you were about to go for a $30,000 ride on a $3,000 claim. What happens is this information is called a CL19, that is forwarded to your General Practitioner, who is asked to complete this information and here is an example of what he thinks. You'll enjoy the diagnosis. I'm just going to run through this. Only (just) four of them and I'll just give you some idea.

This is all within the claim file. We access the claim file after we've interviewed the person and once the case is closed. This one here, as you see, is a little more detailed, but you've got to remember, 250 million dollars are spent locally so there is a tremendous sensitivity about that sort of information. We extract additional notes from the file and so on. It is a source of a major problem for us. We are hoping in the future study that is going to be done in more detail, we'll store the documentation of the person because it gives some better idea for physique and where the head restraint might have been and of course, it could have been moved up, and so on, before it came to the Claim Center.

But there has been a very, very significant study. I don't know if anybody in the audience is part of that group under the chair of Dr. Walter Spitzer, which is just in the process of being published after about three years, where there was emphasis on looking at all the past literature. They went through literally thousands of references, past literature, which has some attempt to better identify, diagnose, so called soft tissue neck injuries and also to come up with some better prognostic indicators of that; and so we're hoping to piggyback on that by having a medical person (in fact, there will be two on a team) but that is still up for discussion, so that an independent medical team will assess every claim as it comes in as well. Thank you.

Q: Everett Kennedy, Farmington Hills, Michigan

Your second subject, the young woman who looked like she was going to be very well protected, the head restraint was high enough and she had very little distance between her head and the head restraint. I want to relate a situation back around 1974 on a Saturday morning, telling my children some key points on safety. I said, "If you're waiting at a light and somebody is approaching and it appears they are not going to stop in time, lean back so your head is against the head restraint and just sit there and wait."

About two months after that my second youngest son, who was about seventeen or eighteen, at night, waiting at a light, saw headlights coming at a high rate of speed and he said "Oh, oh." He leaned back, he was impacted on the right rear, severe enough to blow his rear tire and it was a hit and run besides. It was a big G.M. station wagon. The next morning, I said "do you feel any stiffness in your neck or anything?" He said "no." So I think when we talk about defensive driving, we should talk about defensive standing. I've trained myself, if I'm at a light and there is a car coming, I just lean against the headrest and it will minimize neck injuries.

A: It is very interesting that you say that because Mr. Attaria is here. And Mr. Attaria recently chaired or ran a meeting on head restraints. And I think it is appropriate for me to mention one of the recommendations that came out of that task force was (due to sensitivity to the insurance problem and the cost of these injuries) to do just that, to tell the person that if they saw in their rear-vision mirror, or anticipated it, to rest their head against the headrest. That pre-supposes

there is a head restraint there.

Q: It works. Thank you.

Q: Narayan Yoganandan, Medical College of Wisconsin
A couple of things. This primarily concentrates on single, rear end collisions. Is that correct?

A: Yes. In fact, we isolated, I didn't give all the criteria, just to keep the variables, there are only so many variables. We only have those where there has been only two vehicles involved, only one third party, one vehicle impacting the other.

Q: The impact is not necessarily straight on?

A: We're finding the majority of them are in fact, pretty well, probably 90 degrees off or 180, whichever way you want to look at it, plus or minus 10 or 15 degrees. Mainly because the vast majority, probably over 80 percent, are rear ended when somebody is sitting stationary at traffic lights or waiting to merge. But some of them are offset.

Q: One other thing is, with regard to the aging population of people who are, I don't want to say old, but spinal arthritic degeneration, spinal arthritic myelopathy kind of patients. They may have a really lesser tolerance compared to an impersonario. I mean when a football player, for example, if he chooses to drive his own car, you may have a different kind of problem there when you really filter out your data sample.

A: Yes. I'd agree with you. It's been interesting though in terms of the claims, as you gather. This is very much a pilot study. This is the first time the insurance group has actually let independent people access this and it obviously means that we stay well away from litigation in this area totally. But it's interesting because I can't give you the exact numbers, but I'd say some 80 percent are probably less than 40 years of age. Where I stand, that is pretty young.

Q: And you stay out of litigation for 80 percent of the population. Is that correct?

A: I don't know what the overall numbers are, but just from this study I have a feeling I agree with you. By the way, totally. But I have a feeling one of our very common claimants, I hate to admit it, are young females.

Q: Thanks.

Q: Pat Kaiker, Chrysler Corporation
I would like to recommend that you do a study where, as you continue, put videotapes as the drivers come in and look at their driving posture and compare that with your static setups. And then, when they are in that phase, where they are not being observed or aware of being observed, you might see more slouching behaviors and quite a bit of difference between the static setup and your dynamic driving setup.

A: I'm absolutely sure you are right. We did, I think I mentioned, try to set up video cameras as a person came to Claim Center just for pretty obvious reasons. This was disallowed. We are not able to do that. We will sometimes though, photograph them as they are leaving and I tell them I'm going to just photograph them so I get a better assessment of how you normally sit. I think, undoubtedly, every one of these people would sit in a more slouched position ten minutes down the road.

Q: Was that because of the permission requirement?

A: Pardon me?

Q: In the United States, we don't have the problem. Several states use that type of system to record people at stop signs and going through stop lights. And my question was, in Canada, you are having trouble with getting permission to do it before they are aware of an experiment?

A: We could have done this, certainly, on the road. There is no problem doing it and we considered that, I think this is it, like the Parker-McKee study, but I felt that it really didn't give us as much useful information relative to the head position, relative to the head restraint, because so much was occluded by the physical features of the car. But in terms of them driving to the Claim Center, ICBC puts a priority on service to their customers. The people come as the customers, clients, as it were, and the thought that everything is done with 100% openness. I think that is certainly true from operating down at the Claim Center. So they didn't want to make anything negative like being photographed, "Big Brother's" watching, as you drive into the Claim Center and that was the thinking behind the refusal.